Federal Democratic Republic of Ethiopia

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ET ISO 2103 (1986) (English): Loads due to use and occupancy in residential and public buildings

ISO INSIDE

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ETHIOPIAN
STANDARD

ES ISO 2103:2012

First edition

Loads due to use and occupancy in residential and public buildings

(Identical with ISO 2103:1986)

ICS: 91.040.30; 91.040.10

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Foreword

This Ethiopian Standard has been prepared under the direction of the Technical Committee for Building structures and elements of building (TC 42) and published by the Ethiopian Standards Agency (ESA).

The standard is identical with ISO 2103:1986 Loads due to use and occupancy in residential and public buildings published by International organization for standardization(ISO).

For the purpose of this Ethiopian Standard , the adopted text shall be modified as follows.
. The phrase “International Standard” shall be read as “Ethiopian Standard”; and
. A full stop (.) shall substitute comma (,) as decimal marker.

Loads due to use and occupancy in residential and public buildings

0 Introduction

Characteristic values of loads are defined by ISO 2394 as values that will not be exceeded with a certain probability; evaluation should be based on the available statistical data. For the time being, however, the amount of collected information on loads due to use and occupancy is still insufficient for statistical evaluation.

Since it was considered advisable to publish the values based on these reasons, an attempt has been made to collect the appropriate data on loads due to use and occupancy in residential and public buildings from national codes. It was found that, although some were characteristic, the majority of current imposed values were nominal. A comparison of these values shows that there is general accord between the different national standards and codes in some areas.

Nevertheless, there are inevitable differences for some kinds of loads and, for these reasons, the only acceptable solution seems to be an indication of their lowest values; this has been adopted in this International Standard.

In applying this International Standard to national codes, it is important to recognize that national structural safety is represented by a package comprising action, design rules, safety coefficients, workmanship and national customs, all of which are mutually dependent.

1 Scope and field of application

This International Standard indicates the lowest nominal values of loads due to use and occupancy in residential and public buildings.

The term "equipment" covers furniture, bookshelves, pianos, televisions and radios, refrigerators, washing machines, exhibition displays, special technical installations on laboratory floors, scenery in theatres, gymnastic apparatus, etc.

2 Reference

ISO 2394, *General principles for verification of structural safety*.

3 Load values

3.1 The lowest nominal values of loads due to use and occupancy are defined as the most unfavourable values for certain (or expected) conditions of normal use of a building.

3.2 When designing floors for uniformly distributed loads, the lowest characteristic value shall not be prescribed less than the values given in the table.

3.3 For several floor zones which are used in conditions similar to those in production and storage buildings, loads due to use and occupancy shall be defined according to the rules for those buildings and facilities.

3.4 Besides uniformly distributed load, floors shall also be designed for a concentrated load applied to the element of the floor to produce the most unfavourable effects.

If detailed data for concentrated loads are not available, the load shall be considered as applied to a square area 0,1 m × 0,1 m and its value taken equal to:

a) floors and staircases: 1,5 kN;

b) loft space floors, roofs, terraces and balconies: 1,0 kN;

c) roofs allowing movement of people only by footbridges: 0,5 kN.

3.5 The effect of significant dynamic loads shall be taken into account by dynamic factors or by special dynamic analysis.

3.6 The table does not contain floor loads due to partitions; these should be considered separately. If it is necessary to take into account the effect of the partitions not planned for in the design (or movable partitions), these can be considered as a uniformly distributed load with a lowest nominal value 0,5 kPa if their weight does not exceed 2,5 kN/m.[1] In all other cases, the effect of partitions shall be determined as a function of their position, their weight and their jointing to other elements of the building.

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[1] This applies only to floors where, due to the structural system, the partition loads are sufficiently distributed in a direction transverse to the partition.

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Table — Lowest nominal values of uniformly distributed loads

No.	Buildings and premises	Lowest nominal values of loads kPa
1	Residential flats, bedrooms in kindergartens and schools, dwellings, hotel rooms, hospital and sanatorium wards, etc.	1,5
2	Offices for administration, technical and scientific staff, classrooms in schools and colleges, cloak-rooms, shower-baths, lavatories in industrial and public buildings	2,0
3	Studyrooms and laboratories in health, education or scientific establishments, rooms with data processing equipment, kitchens in public buildings, technical floors, basements, etc.	2,0
4	Halls:	
	a) reading-rooms (without bookshelves)	2,0
	b) dining-rooms (in cafés, restaurants, etc.)	2,0
	c) conference-halls, waiting-rooms, theatre and concert halls, gymnasia, ballrooms, etc.	4,0
	d) department stores	4,0
	e) exhibition halls (in addition to equipment and materials)	2,5
5	Shelving in libraries, offices with filing storage, stages in theatres, etc.	5,0
6	Stands:	
	a) with fixed seats	4,0
	b) without fixed seats	5,0
7	Loft space (in addition to the weight of equipment and materials)	0,7
8	Terraces and roofs:	
	a) zones for rest	1,5
	b) zones crowded by people leaving halls, offices, production buildings, etc.	4,0
9	Balconies and loggias:	
	a) strip uniformly loaded in an area 0,8 m wide along the barrier	4,0
	b) uniformly loaded over the whole balcony area, if its effect is more unfavourable than that in a)	2,0
10	Lobbies, foyers, corridors, staircases (with adjacent passages), adjoining premises specified in	
	a) No. 1	2,5
	b) Nos. 2 and 3	3,0
	c) Nos. 4 and 5	4,0
	d) No. 6	5,0
11	Platforms of railway and subway stations	4,0
12	Garages and carparks for passenger cars and light vehicles (not for trucks)	2,5

NOTES

1 Loads specified in No. 8 shall be taken instead of snow loads if they give more unfavourable results.

2 Loads specified in No. 9 shall be taken into account when analysing the load-bearing elements directly supporting balconies (loggias). When analysing lower wall zones, bases and foundations, the load on balconies and loggias is taken equal to the load due to adjoining main premises of the building and may be reduced in accordance with clause 4.

3 Loads specified in the table include some allowance for impact arising from the usual movement of people and furniture.

4 If necessary, national standards may apply further subdivision to any floor zone for which a single load value is specified in this table. For example, some areas may be unloaded if this produces a more unfavourable effect.

4 Reduction of uniformly distributed loads

It is recommended that uniformly distributed loads (except the loads due to stationary equipment and stocked materials) are reduced for analysis of:

a) floor beams— as a function of floor zone dimensions supported by the beams (tributary area),

b) columns, walls, bases and foundations, as in the previous case or as a function of the number of floors supported above the floor under consideration.

When analysing beams with load tributary area A (in square metres), the load specified in the table may be reduced:

a) for premises specified in Nos. 1 and 2 of the table, by multiplying by the factor

$$\alpha_1 = 0{,}3 + \frac{3}{\sqrt{A}} \text{ (if } A > 18 \text{ m}^2\text{)} \qquad \ldots \text{ (1)}$$

b) for premises specified in No. 4 of the table, by multiplying by the factor

$$\alpha_2 = 0{,}5 + \frac{3}{\sqrt{A}} \text{ (if } A > 36 \text{ m}^2\text{)} \qquad \ldots \text{ (2)}$$

When analysing columns, walls, bases and foundations, the loads given in the table may be reduced:

a) for premises specified in Nos. 1 and 2 of the table, by multiplying by the factor

$$\eta_1 = 0{,}3 + \frac{0{,}6}{\sqrt{n}} \text{ (for } n \geqslant 2\text{)} \qquad \ldots \text{ (3)}$$

b) for premises specified in No. 4 of the table, by multiplying by the factor

$$\eta_2 = 0{,}5 + \frac{0{,}6}{\sqrt{n}} \text{ (for } n \geqslant 2\text{)} \qquad \ldots \text{ (4)}$$

where n is the number of completely loaded floors considered in the analysis (over the cross-section considered): for $n = 1$, $\eta_1 = 1$, and $\eta_2 = 1$.

NOTE — National standards may admit other methods of reducing the uniformly distributed loads as functions of area dimensions and number of storeys, provided the resulting load is not smaller than the reduced load derived in accordance with this International Standard.

5 Horizontal loads

Minimal characteristic values of horizontal loads per unit length on the hand-rails and balcony barriers shall be taken as follows:

a) for residential buildings, kindergartens, hospitals and other health establishments: 0,3 kN/m;

b) for stands and gymnasia: 1,5 kN/m;

c) for other buildings and premises: 0,8 kN/m.

For service platforms, foot-bridges, roof barriers visited only by individuals, the minimum characteristic value of horizontal concentrated load on hand-rails and barriers shall be taken equal to 0,3 kN (at any point along the barrier). The same value of horizontal concentrated load should be taken for lightweight partitions.

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Ethiopian Standards Agency

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Organization and Objectives

The Ethiopian Standards Agency (ESA) is the national standards body of Ethiopia established in 2010 based on regulation No. 193/2010.ESA is established due to the restructuring of Quality and Standards Authority of Ethiopia (QSAE) which was established in 1970.

ESA's objectives are:-

- Develop Ethiopian standards and establish a system that enable to check weather goods and services are in compliance with the required standards,
- Facilitate the country's technology transfer through the use of standards,
- Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational Institutions, research institutes, government organizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/ or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes.
Orders for all Ethiopian Standards, International Standard and ASTM standards, including electronic versions, should be addressed to the Documentation and Publication Team at the Head office and Branch (Liaisons) offices. A catalogue of Ethiopian Standards is also available freely and can be accessed in from our website.

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International Involvement
ESA, representing Ethiopia, is a member of the International Organization for Standardization (ISO), and Codex Alimentarius Commission (CODEX). It also maintains close working relations with the international Electro-technical Commission (IEC) and American Society for Testing and Materials (ASTM).It is a founding member of the African Regional Organization for standardization (ARSO).

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